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## **CLAIMS**

1	1. A cryoablation system comprising a coolant console having		
2	a reservoir of phase change coolant		
3	first means for providing the phase change coolant from the reservoir at		
4	elevated pressure along an inlet line to a cryotreatment probe		
5	second means for recovering the phase change coolant from the cryotreatment		
6	probe and raising its pressure		
7	said first and second means forming a supply loop through the cryotreatment		
8	probe and the first means being arranged in heat exchange communication to condition		
9	the coolant before it reaches the probe along the inlet line so as to achieve effective		
10	cooling regimens by controlling phase change coolant provided along the inlet line		
11	while continuously recovering and recirculating expended coolant.		
1	2. The cryoablation system of claim 1, wherein the first means conditions		
2	temperature of the coolant at elevated pressure in the inlet line, and further		
3	comprising		
4	a pressure regulator for controlling flow of coolant between the inlet line and		
5	the probe, and		
6	a processor configured for setting the pressure regulator to effect a treatment		
7	cycle.		
1	3. The cryoablation system of claim 1, wherein said second means includes a		
2	vacuum communicating return passage forming a vacuum jacket about the inlet line		
3	for thermally insulating the circulating coolant.		
1	4. The cryoablation system of claim 2, wherein the processor sets treatment		
2	cycles of a first duration for mapping and treatment cycles of a second duration for		
3	ablation.		

1	5.	The cryoablation system of claim 2, wherein the processor sets treatment	
2	cycles of a first pressure for treatment of point regions and treatment cycles of a		
3	secon	d pressure for treatment of linear regions.	
1	6.	The cryoablation system of claim 2, wherein the processor sets treatment	
2	cycles of a first pressure for mapping and treatment cycles of a second pressure for		
3	ablation.		
1	7.	The cryoablation system of claim 1, further comprising	
2		a return line configured for returning unconditioned coolant under pressure	
3	from the supply loop to the reservoir.		
1	8.	The cryoablation system of claim 1, wherein the second means includes a	
2	, vacuum pump for drawing expended coolant from the cryotreatment probe, and said		
3	vacuum pump raises pressure of said expended coolant for return to the first means.		
1	9.	The cryoablation system of claim 8, wherein the reservoir provides said phase	
2	chang	ge coolant at a first pressure to said first means, and the vacuum pump returns the	
3	expended coolant to the first means along a return line at a pressure above said first		
4	pressure.		
1	10.	The cryoablation system of claim 1, wherein the system includes a	
2	comp	ressor.	

1	11. A coolant system for providing cryoablation fluid to a cryotreatment probe		
2	such as a mapping or ablation catheter, wherein the coolant system comprises		
3	a tank for holding a coolant liquid, said tank having an inlet and an outlet		
4	a pressure regulator for reducing pressure of liquid from the outlet for		
5	facilitating phase change of said liquid		
6	a heat exchanger for placing a catheter coolant injection line in heat exchange		
7	relation with said reduced pressure liquid to thereby cool the coolant injection line		
8	a compressor, and a condenser, the reduced pressure liquid passing through		
9	the condenser and into the compressor to form a hot pressurized vapor output		
0	the hot pressurized vapor output passing through the condenser along said		
1	injection line to become a cooled pressurized output while vaporizing the reduced		
12	pressure liquid prior to its entry into the compressor, and		
13	pressure regulation means downstream of the condenser,		
14	said pressure regulation means		
15	building up pressure of said cooled pressurized output in a first branch		
16	for returning coolant to the tank inlet, and		
17	conditioning and controlling the coolant in a second branch for		
18	injection into the cryotreatment probe.		
1	12. The coolant system of claim 11, further comprising		
2	a vacuum recovery unit connectable to the probe for receiving return flow of		
3	injected coolant therefrom		
4	said vacuum recovery unit including a vacuum pump which receives said		
5	return flow at a vacuum inlet side thereof and pumps it to a pump outlet side, and		
6	a recovery return line extending from said pump outlet side to the reduced		
7	pressure liquid downstream from the tank outlet thereby forming together with the		
8	catheter a supply loop for said cryoablation fluid.		

1	13. The coolant system of claim 12, further comprising a bypass return line		
2	connected between said probe inlet side and said recovery return line, said bypass		
3	return line including a pressure regulator for reducing pressure from said probe inlet		
4	side to a lower pressure of said recovery return line, and wherein said lower pressure		
5	of the recovery return line is higher than pressure of the reduced pressure liquid from		
6	the refrigerant tank, thereby assuring circulation of cryoablation fluid in the supply		
7	loop through the probe, the compressor and the condenser.		
1	14. A coolant system for operation of a cryotreatment catheter to treat a patient,		
2	such system comprising		
3	a reservoir of phase change fluid		
4	a compressor for elevating the pressure of said fluid		
5	a conditioning assembly for conditioning temperature of the elevated pressure		
6	fluid		
7	a microprocessor-controlled pressure regulator for setting a cryotreatment		
8	supply regimen of defined pressure and duration to supply an effective amount of		
9 ·	conditioned fluid to a coolant port of the cryotreatment probe, and		
10	a vacuum recovery assembly connectable to the cryotreatment probe for		
11	continuously drawing expended fluid from the probe thereby preventing leakage into		
12	the bloodstream of the patient.		
1	15. The coolant system of claim 14, wherein the vacuum recovery assembly		
2	returns the expended fluid at intermediate pressure to the compressor thereby forming		
3	a closed supply loop of said conditioned temperature elevated pressure fluid supplied		
4	to the pressure regulator.		
1	16. The cryoablation system of claim 14 further including protection valves		
2	counted to the compressor for allowing the fluid to return directly to the compressor		